

WHAT IS CLAIMED IS:

1. A toner formed of a material mainly containing polyester-based resin as a resin component, wherein

the polyester-based resin comprises block polyester mainly composed of a block copolymer, and amorphous polyester having crystallinity lower than that of the block polyester, wherein the block polyester comprises a crystalline block obtained by condensation of a diol component with a dicarboxylic acid component, and an amorphous block having crystallinity lower than that of the crystalline block, wherein the acid value of the toner is 8.0 KOHmg/g or less.

2. The toner as claimed in claim 1, wherein the melting point of the block polyester is higher than the softening point of the amorphous polyester.

3. The toner as claimed in claim 1, wherein the amorphous polyester contains a monomer component and the block polyester contains a monomer component, in which 50 mol% or more of the monomer component of the amorphous polyester is the same as the monomer component of the amorphous block of the block polyester.

4. The toner as claimed in claim 1, wherein the compounding ratio between the block polyester and the amorphous polyester is in the range of 5:95 to 45:55 in weight ratio.

5. The toner as claimed in claim 1, wherein the content of the crystalline block in the block polyester is in the range of 5 to 60 mol%.

6. The toner as claimed in claim 1, wherein 80 mol% or more of the diol component constituting the crystalline block of the block polyester is aliphatic diol.

7. The toner as claimed in claim 1, wherein the diol component constituting the crystalline block of the block polyester has a straight-chain molecular structure containing 3 to 7 carbon atoms and hydroxyl groups at both ends of the chain.
8. The toner as claimed in claim 1, wherein 50 mol% or more of the dicarboxylic acid component constituting the crystalline block of the block polyester has a terephthalic acid structure.
9. The toner as claimed in claim 1, wherein the amorphous block of the block polyester contains a diol component, and at least a part of the diol component is aliphatic diol.
10. The toner as claimed in claim 1, wherein the amorphous block of the block polyester contains a diol component, and at least a part of the diol component has a branched chain.
11. The toner as claimed in claim 1, wherein the melting point of the block polyester is 190°C or higher.
12. The toner as claimed in claim 1, wherein the heat of fusion of the block polyester determined by measuring the endothermic peak of the block polyester at its melting point according to differential scanning calorimetry is 3 mJ/mg or greater.
13. The toner as claimed in claim 1, wherein the weight average molecular weight M_w of the block polyester is in the range of 1×10^4 to 3×10^5 .
14. The toner as claimed in claim 1, wherein the block polyester is a linear polymer.
15. The toner as claimed in claim 1, wherein the amorphous polyester contains a dicarboxylic acid component, and 80 mol% or more of the dicarboxylic acid component has a terephthalic

acid structure.

16. The toner as claimed in claim 1, wherein the weight average molecular weight M_w of the amorphous polyester is in the range of 5×10^3 to 4×10^4 .

17. The toner as claimed in claim 1, wherein the amorphous polyester is a linear polymer.

18. The toner as claimed in claim 1, wherein the block polyester and the amorphous polyester are sufficiently soluble with each other, or the block polyester and the amorphous polyester are almost soluble with each other in which aggregated fine crystalline blocks of the block polyester are dispersed in the form of fine particles.

19. The toner as claimed in claim 1, wherein the compounding ratio between the block polyester and the amorphous polyester is in the range of 5:95 to 20:80 in weight ratio, wherein the content of the crystalline block in the block polyester is in the range of 40 to 60 mol%.

20. The toner as claimed in claim 1, wherein the compounding ratio between the block polyester and the amorphous polyester is in the range of 5:95 to 20:80 in weight ratio, wherein the softening point $T_{1/2}$ of the block polyester is in the range of 200 to 230°C.

21. The toner as claimed in claim 1, wherein the compounding ratio between the block polyester and the amorphous polyester is in the range of 5:95 to 20:80 in weight ratio, wherein the acid value of the amorphous polyester is in the range of 3 to 15 KOHmg/g.

22. The toner as claimed in claim 1, wherein the content of

the polyester-based resin in the toner is in the range of 50 to 98 wt%.

23. The toner as claimed in claim 1, further comprising an external additive.

24. The toner as claimed in claim 23, wherein the external additive contains negatively-chargeable silica.

25. The toner as claimed in claim 23, wherein the external additive contains positively-chargeable silica.

26. The toner as claimed in claim 25, wherein the average grain size of the positively-chargeable silica is in the range of 30 to 100 nm.

27. The toner as claimed in claim 25, wherein the positively-chargeable silica is obtained by treating silica gel with a silane coupling agent having an amino group.

28. The toner as claimed in claim 23, wherein the ratio of the external additive liberated from the surfaces of toner particles of the toner is 5 wt% or less.

29. The toner as claimed in claim 28, wherein at least a part of the external additive liberated from the surfaces of the toner particles functions as a micro carrier to be charged with polarity opposite to that of the toner particles.

30. The toner as claimed in claim 23, wherein the coating ratio of toner particles of the toner with the external additive is in the range of 100 to 300 %.

31. The toner as claimed in claim 23, wherein the content of the external additive is in the range of 4 wt% or less.

32. The toner as claimed in claim 1, wherein the average roundness R determined by the formula $R = L_0/L_1$ is in the range of 0.90 to 0.98, where L_1 (μm) is a circumferential length of a projected image of a toner particle of the toner which is an object to be measured, and L_0 (μm) is a circumferential length of a true circle having an area equal to the area of the projected image of the toner particle of the toner which is an object to be measured.

33. The toner as claimed in claim 1, wherein the average particle size of the toner is in the range of 3 to 12 μm .

34. The toner as claimed in claim 1, further comprising a wax.

35. The toner as claimed in claim 34, wherein the content of the wax is 5 wt% or less.

36. The toner as claimed in claim 1, wherein the toner is to be used with a fixing device which comprises a fixing roller, a pressure roller which is in contact with the fixing roller under pressure through a fixing part, and a release member for use in releasing a recording medium which has been passed through the fixing nip part, from the fixing roller.

37. The toner as claimed in claim 36, wherein the fixing device has a recording medium feed speed of 0.05 to 1.0 m/s.

38. The toner as claimed in claim 36, wherein the releasing member is a plate-shaped member having a predetermined length in the axial direction of the fixing roller and/or the pressure roller.

39. The toner as claimed in claim 36, wherein the release member is disposed on the further downstream side than the

fixing nip part in a direction of conveying the recording medium.

40. The toner as claimed in claim 36, wherein the release member is disposed in the vicinity of the fixing roller and/or the pressure roller.

41. The toner as claimed in claim 36, wherein the fixing roller and the pressure roller are arranged almost in the horizontal state.

42. The toner as claimed in claim 36, wherein the release member is disposed such that a gap between the fixing roller and the release member is kept substantially constant when the fixing device is operated.

43. The toner as claimed in claim 36, wherein the release member is disposed along the axial direction of the fixing roller and has a shape that is suited for the shape of the exit of the fixing nip part.

44. The toner as claimed in claim 36, wherein when an angle on the side of the fixing roller with respect to a tangent at the exit of the fixing nip part is defined as a positive angle and an angle on the side of the pressure roller with respect to the tangent at the exit of the fixing nip part is defined as a negative angle, the arrangement angle θ_A of the release member with respect to the tangent at the exit of the fixing nip part is in the range of -5 to $+25^\circ$.

45. The toner as claimed in claim 36, wherein the release member extends along the axial direction of the fixing roller and the pressure roller, and is disposed in the vicinity of the fixing roller and the pressure roller on the further downstream side than the fixing nip part in the direction of conveying the

recording medium, and the fixing device further comprises a release member for the pressure roller, wherein the positioning of the release member on the side of the fixing roller is performed by the surface of the fixing roller and the positioning of the release member on the side of the pressure roller is performed by the surfaces of both bearings of the pressure roller.

46. The toner as claimed in claim 45, wherein the length in the axial direction of the pressure roller is shorter than that of the fixing roller so that spaces are created at each end of the pressure roller, wherein the bearings are provided in the spaces, respectively.

47. The toner as claimed in claim 36, wherein a gap G2 (μm) between the fixing roller and the release member in the vicinity of each end in the axial direction of the fixing roller is larger than a gap G1 (μm) between the fixing roller and the release member in the vicinity of the central part in the axial direction of the fixing roller.

48. A fixing device for fixing the toner claimed in claim 1 onto a recording medium.

49. The fixing device as claimed in claim 48, which comprises:
a fixing roller;
a pressure roller which is in contact with the fixing roller under pressure through a fixing nip part; and
a release member for use in releasing a recording medium which has been passed through the fixing nip part, from the fixing roller.

50. The fixing device as claimed in claim 49, wherein the fixing device has a recording medium feed speed of 0.05 to 1.0 m/s.

51. The fixing device as claimed in claim 49, wherein the release member is a plate-shaped member having a predetermined length in the axial direction of the fixing roller and/or the pressure roller.

52. The fixing device as claimed in claim 49, wherein the release member is disposed on the further downstream side than the fixing nip part in a direction of conveying the recording medium.

53. The fixing device as claimed in claim 49, wherein the release member is disposed in the vicinity of the fixing roller and/or the pressure roller.

54. The fixing device as claimed in claim 49, wherein the fixing roller and the pressure roller are arranged almost in the horizontal state.

55. The fixing device as claimed in claim 49, wherein the release member is disposed such that a gap between the fixing roller and the release member is kept substantially constant when the fixing device is operated.

56. The fixing device as claimed in claim 49, wherein the release member is disposed along the axial direction of the fixing roller and has a shape that is suited for the shape of the exit of the fixing nip part.

57. The fixing device as claimed in claim 49, wherein when an angle on the side of the fixing roller with respect to a tangent at the exit of the fixing nip part is defined as a positive angle and an angle on the side of the pressure roller with respect to the tangent at the exit of the fixing nip part is defined as a negative angle, the arrangement angle θ_A of the

release member with respect to the tangent at the exit of the fixing nip part is in the range of -5 to $+25^{\circ}$.

58. The fixing device as claimed in claim 49, wherein the release member extends along the axial direction of the fixing roller and the pressure roller, and is disposed in the vicinity of the fixing roller and the pressure roller on the further downstream side than the fixing nip part in the direction of conveying the recording medium, and the fixing device further comprises a release member for the pressure roller, wherein the positioning of the release member on the side of the fixing roller is performed by the surface of the fixing roller and the positioning of the release member on the side of the pressure roller is performed by the surfaces of both bearings of the pressure roller.

59. The fixing device as claimed in claim 58, wherein the length in the axial direction of the pressure roller is shorter than that of the fixing roller so that spaces are created at each end of the pressure roller, wherein the bearings are provided in the spaces, respectively.

60. The fixing device as claimed in claim 49, wherein a gap $G2$ (μm) between the fixing roller and the release member in the vicinity of each end in the axial direction of the fixing roller is larger than a gap $G1$ (μm) between the fixing roller and the release member in the vicinity of the central part in the axial direction of the fixing roller.

61. An image forming apparatus comprising the fixing device claimed in claim 48.